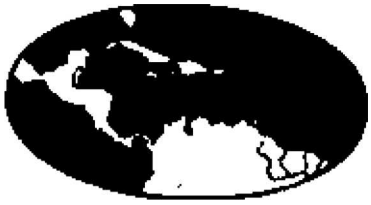
Joint symposium on maize and peanut. Held in Suriname
on behalf of the 75th Anniversary of
The Agricultural Experiment Station of Paramaribo.

November 13 — 18, 1978



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CITRUS PLANTMATERIAL IMPROVEMENTS

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INTRODUCTION

Research has been aimed at raising production capacity of high quality fruits by combining genetic potentials and by application of disease-free (especially virus-free) and footrot-tolerant plantmaterial. Rootstock trials and extensive evaluation of clones and/or cultivars that have been conducted disclosed some dramatic potentials of different stock-scion combinations. Soil type imparts a significant role on yield and fruit quality. With respect to production and fruit quality, the clay soils are preferable to sandy soils; however tree life is believed to be shorter on clay soil, due to poor drainage conditions.

ROOTSTOCKS FOR ORANGES

With regard to rootstock effect, a distinction should be made between combinations with a virus-free and combinations with a virus-infected top. When budded with virus-free Alidjan budwood, Rangpur lime induced the highest (accumulative) yield, followed by Troyer and Rough lemon, while Sour orange was the least productive, (fig. 1). In the combinations with virus-infected Kwata budwood, the relatively highest productions were totalled by King, Surino and Cleopatra. Moreover these stocks attain the same level of production either with virus-free or virus-infected budwood as top. Consequently, these stocks are tolerant to the virus-complex and can be used with either type of budwood.

The sandy soils of the interior are being explored, for their potentials. Both table 1 and 2 display preliminary results of rootstock performance in that area. The Rough lemon types induced the largest trees, but also low fruit quality with low percentages of juice. Yuzu is a recently imported stock and performs almost equal to Rangpur lime. Soil moisture retention of these sandy soils is low and probably resulted in bad performance of Troyer in contrast to its behaviour in the coastal clays. (Fung-Kon-Sang, E. and T. Nanden Amattaram, 1975).

Production has been discontentedly low in 1978 after a good start in the previous year, for reasons unknown.

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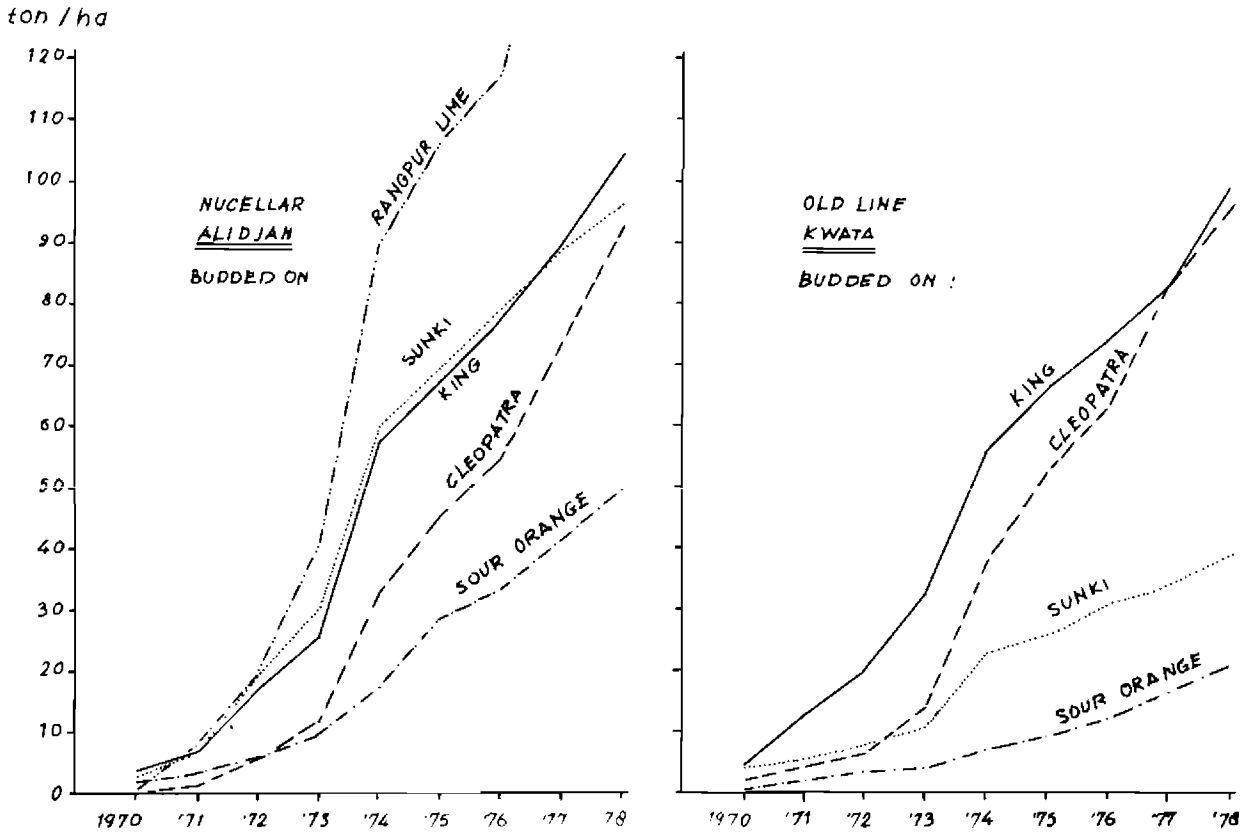

Fig. 1. Accumulated production of different orange combination

Table 1. Relative tree-size of Valencia (47-14 ex BH) in combination with different rootstocks in sandy soil at Coebiti. Planting date: jan. 1972. Observation: Jan. 1978.

Valencia budded on:	Trunk circumf. (cm) stock	scion	Tree height (cm)	Fruits p. tree (1977)	1978
Volkameriana	51	50	451	123	11
Red Rough lem.	44	43	433	47	12
Estes Rough lem.	45	42	431	48	5
Rough lem. Fla	45	44	424	68	3
Rough lem. -A	42	39	407	51	6
Rangpur lime	44	41	384	49	8
Yuzu	41	39	398	66	10
Orlando tangelo	41	39	375	20	2
Sunki mand.	39	36	353	41	3
Troyer citr.	34	29	286	16	2

Table 2. Fruit characteristics of Valencia (47 – 14 ex BH) in combination with different rootstocks in sandy soil at Coebiti.
Observation: Sept. 1977

Valencia budded on:	Fruit wt. (g)	juice (%)	acid (%)	brix (°)	seeds p.fru.
Volkameriana	208	46.0	1.70	9.2	7.0
Red Rough lem.	206	48.3	1.33	9.1	6.9
Estes Rough lem.	194	50.1	1.52	9.2	6.6
Rough lem. Fla	228	42.7	1.59	8.8	6.1
Rough lem. -A	238	42.3	1.25	8.9	5.5
Rangpur lime	221	48.1	1.43	9.2	6.6
Yuzu	212	51.3	1.56	8.8	6.6
Orlando tangelo	246	48.3	1.20	8.9	7.2
Sunki mand.	235	48.9	1.35	9.5	4.9
Troyer citr.	283	51.0	1.02	10.0	4.9

Rootstocks for grapefruit

Sunki, King and Troyer were the most productive stocks for Hooghart grapefruit in clay soil, when expressed in number of fruits. (Fung-Kon-Sang, E, 1977).

Relatively, Cleopatra induced the lowest yield, but when given sufficient time this stock

might have gained. After 10 years in the field, this experiment was discontinued after that excessive rainfall followed by extreme drought in 1976 caused the death of many trees. Since 1973 a larger number of stocks have been put under test in sandy soil, of which update results are presented in table 3. Planted in 1973 these trees still produced no substantical amount of fruits. Volkameriana, a Rough lemon type induced the largest trees, while Sour orange again occupied the last place.

Table 3. Relative tree size of Marsh grapefruit in combination with different rootstocks in sandy soil at Coebiti
Planting date: May 1973; Observation: May 1978.

Marsh budded on:	Trunk girth (cm) stock	scion	Tree height (cm)
Volkameriana	51	48	465
Rangpur lime	49	48	463
Sunki	41	40	409
Amblycarpa	42	38	381
Yuzu	38	36	377
Cleopatra	38	35	376
Troyer	37	32	368
Caipira	35	34	347
Surino	37	33	346
(Rode) King	35	30	340
Citrumelo	30	22	293
Sour orange	25	23	265

Scion varieties

Oranges

Quite a number of orange cultivars have been observed especially with regard to fruit quality. Locally selected Kwata orange was solely propagated, because sufficient knowledge of the potentials of other cultivars was lacking. In general, fruits of early cultivars are susceptible to granulation and they lose their flavour when stored too long on the tree. Hamlin orange for example is totally unacceptable under all soil conditions for it even granulates when the fruits are still greenish. Navel orange performs slightly better but suffers moreover from oversized fruit when kept too long on the tree. Parson Brown is not ideal but is now considered the most acceptable early cultivar.

The mid-season and late varieties are better suited to the tropics. The first mentioned group is represented by Kwata orange, while Valencia will be added in order to extend the season. Some recently imported varieties (e.g. Westin) will be observed for their potentials.

Grapefruits

Since almost all grapefruit is cultivated for export where Marsh seedless is preferred, there is little or no need for varietal tests. Multi-year comparison of Marsh and a local selection called Hooghart proved the latter to be indistinguishable from Marsh. However there are indications, that red-fleshed grapefruit is gaining popularity, reason why recently the Star Ruby grapefruit was acquired from Texas. An observation plot will be established soon.

Miscellaneous

The local market has shown trends toward a diversification and especially toward mandarins and their hybrids. 'Gele King' tangor 'Curacaosche oranje' mandarin and 'Minneola' tangelo are already high in demand; all with excellent flavour and easy peelable.

Some new introductions as Ponkan, Dancy, Clementine, Mexerica de Rio and Robinson mandarins, Ortanique and Murcott tangors are being observed and await fruit analysis. Ortanique looks promising, while Mexerica de Rio, Robinson and Murcott, although delicious, have small fruit sizes. Also attention is given to the so-called 'pompelmoes' *(Citrus maxima)*, a variety with high heat requirement and thus almost confined to the warm and humid tropics.

REFERENCES

Fung-Kon-Sang, W.E. & T. Nanden-Amattaram. Citrus rootstock performance with old and nucellar orange tops on heavy clay soils of the coastal plain in Surinam. De Surinaamse Landbouw, vol. 23 (1975) : 109 – 119.

Fung-Kon-Sang, W.E. Rootstocks for grapefruit in the coastal clays of Surinam. De Surinaamse Landbouw, Vol. 25 (1977): 14 – 20.

NAME OF PAPER: Citrus Plantmaterial Improvements
(Fung Kon Sang)

Questions by: S. Hilario
Country: Dominican Rep.

QUESTIONS:

1. To what do you attribute the low yield of the sour oranges here?

2. Of what origin is the used material in sour oranges?

ANSWERS:

1. Low production is because of drainage problem, diseased plant material and poor cultivation methods.

2. Orange material of sour orange probably from South Europe.

Questions by: Ferdinand Klas
Country: Suriname.

QUESTIONS:

1. Neither from your paper nor from your presentation it became clear what virus you were talking about in the case of virus infected kwata or virus free Alidjan?

2. How have you proved that the kwata material was really infected with any viruses?

3. Have you conducted those experiments with virusfree kwata. Did you compare production of virusfree kwata on the mentioned rootstocks with virusfree Alidjan on these rootstocks?

ANSWERS:

1. Kwata is infected with psorosis, exocortis and xyloporosis (cachexia).

2. That Kwata is infected with viruses, was proved by:
Kraayenga D.A. See: De Surin. Landb. 1963 11 — (page 46-51) for exocortis.
For tristeza see: Kraayenga, D.A. In: Congress Agric. Research in the Guiana's 1963 bull. 82 (1964) 65 — 69.
For psorosis: idem as with triseza.
For xyloporosis. See: Childs, J.F.L. Observations on citrus culture and problems in Surinam.
Dutch Guyana II. De Surin. Landb. 14 (1966): 136 — 142.

3. Experiments with virusfree Kwata are running now.
   Differences between virusfree Alidjan and virusinfected Kwata are probably not varietal, since production on King and Cleopatra stock were similar with either type of budwood.

Questions by: C. C. Weir
Country: Jamaica

QUESTIONS:

1. What was the source of the Nucellar planting material you used?

2. Is the quality of the Ortaniques grown in Suriname good? What areas in Suriname are best suited for ortanique growing?

ANSWERS:

1. The source of the nucellar planting material was a seedling tree and very similar to Valencia orange.

2. External quality of Ortaniques in Suriname is not too good, because of scab.
   We have not enough experience with different areas for Ortanique growing.